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# CANADIAN TIMBER FRAME CONSTRUCTION



the answer  
to better  
**HOUSING**







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# CANADIAN TIMBER FRAME CONSTRUCTION

## the answer to better HOUSING

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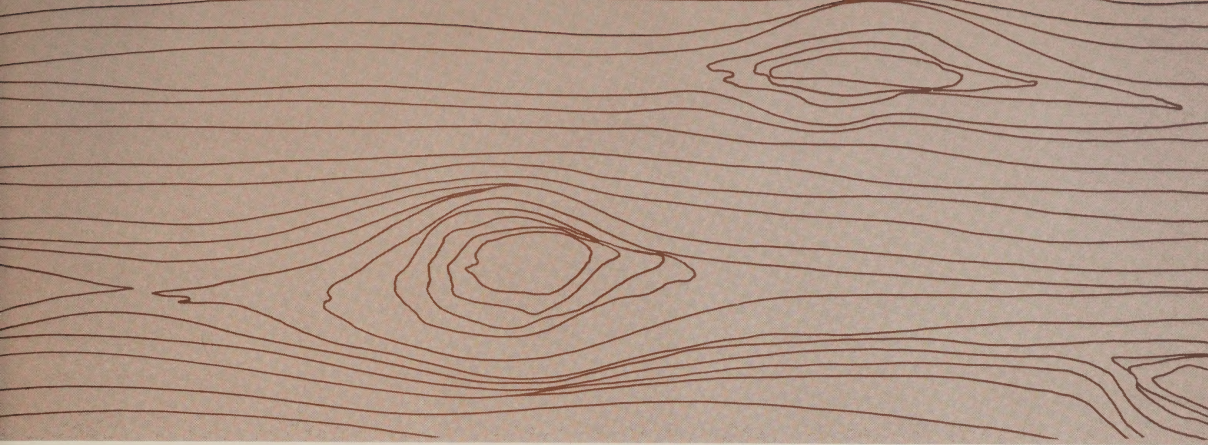




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## the answer to better housing

Frame construction, popular in Canada for more than 100 years and used today to build nine out of ten North American homes, is rapidly taking hold in Britain.

It permits speedier, more efficient construction, higher labour productivity, and more design flexibility. Costs are lower and the resulting structure more attractive. Timber frame houses can be built in about half the time it takes to build brick houses.

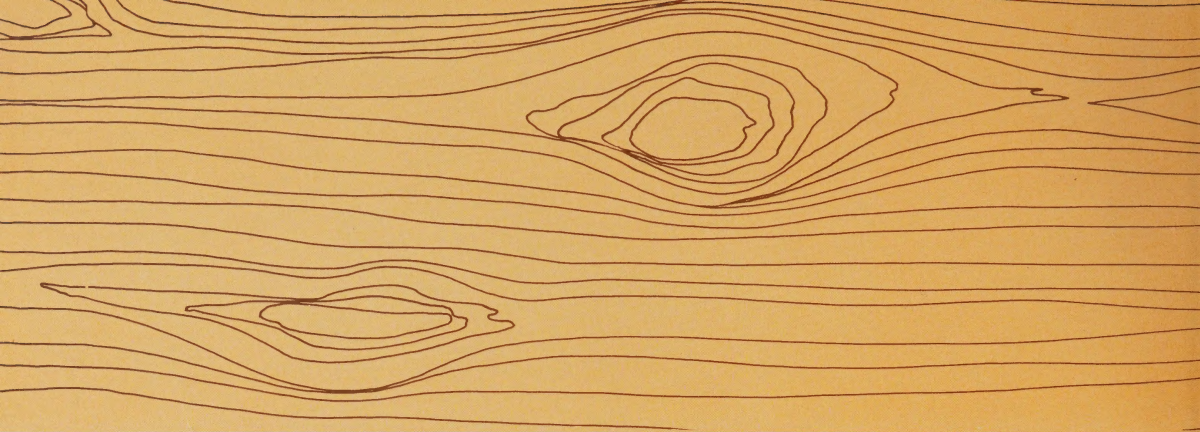
Methods employed in frame construction are a modern development of ideas taken to the New World by early British settlers. Materials are used more economically and efficiently. Both popular trends and dramatic concepts in design can be expressed in frame construction. Construction techniques can be quickly acquired without upsetting building practice or creating labour problems.

Possibilities in prefabrication are many. Wall frames and components for floors and roofs can be factory built with great economy and easily transported to the construction site. The structure can be erected and quickly roofed in allowing all finishing work to take place under cover. Where power tools are available house frames can be fabricated on the site.

Wood, as a material, has a very high insulation value; even without central heating, the homeowner benefits from substantial savings in fuel. The smaller heat loss through timber framed-walls makes controlled heating thoroughly worthwhile.

Because walls and partitions can be of dry construction there is no delay in interior decoration and dwellings are habitable the day the builder leaves. Frozen pipes are unknown and construction facilitates hiding of unsightly plumbing in the wall structure.

Timber frame houses of sound design and workmanship have a life that can compare favourably with other types of construction. All timber is isolated from



brickwork and the provision of air vents eliminates the usual starting points of dry rot. Timber members are mutually supporting and foundation loads are lighter.

There are three kinds of timber frame construction. The most common is the platform type, which lends itself to prefabrication. The wall sections rest on the subfloor platform and the first-floor joists rest on the top plate of the wall section. Another type, balloon frame construction, is more commonly used in two-storey houses. In this case, the studs are continuous from sill to eaves, and first-floor joists are carried on a horizontal member which is notched to the studs. Finally, in post and beam construction, the roof decking is carried on beams spaced eight feet apart, the ends of which rest on posts. The wall spaces between the posts are provided with supplementary framing for the attachment of exterior and interior finish.

Timber frame construction is the key to increased productivity and economy, giving the high standards of comfort and modern features demanded by today's discriminating buyer.

In the pages that follow, essential steps in timber frame construction are outlined in a series of pictures, from the pouring of concrete for the foundation, to the finished house. The step-by-step outline includes foundations, floor joists, sub-flooring, framing, sheathing, brick veneer wall, moisture barrier, roofing, exterior cladding and the sub-trades.

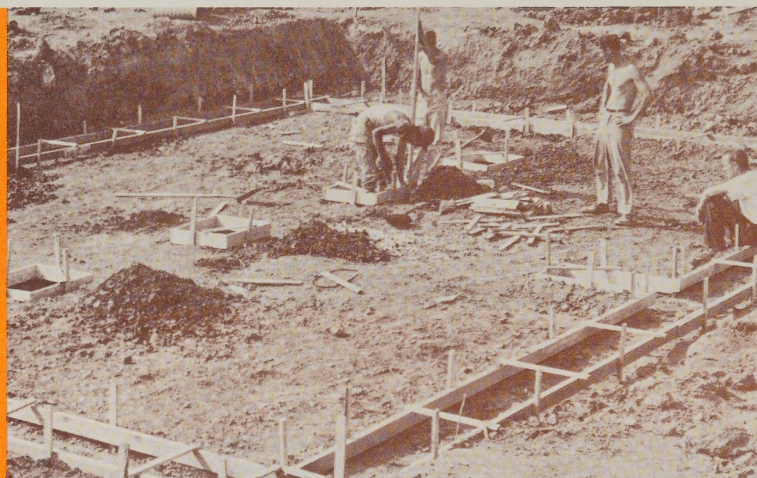




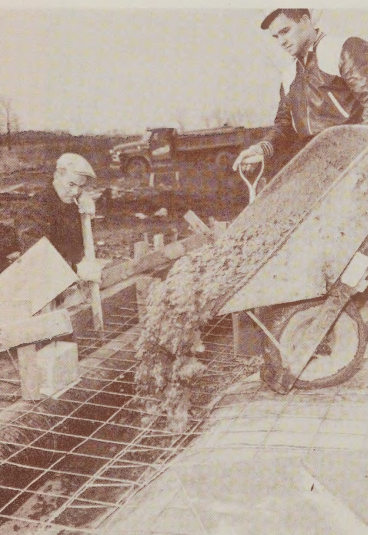




# foundations



◁ Footings for basement columns are poured at the same time as outside footings which carry the foundation walls.



△ Here a basementless house is being constructed on a cement slab. To keep the slab free of moisture a vapour barrier is placed between the ground and the concrete which is reinforced by a wire mesh halfway through the slab. Warm-air heating ducts may be built into the slab.



△ Foundation walls are damp-proofed on the outside with tar to keep the basement of a new house dry. Drain tiles at the base of the walls are covered with crushed stone before the earth is replaced around the foundation.

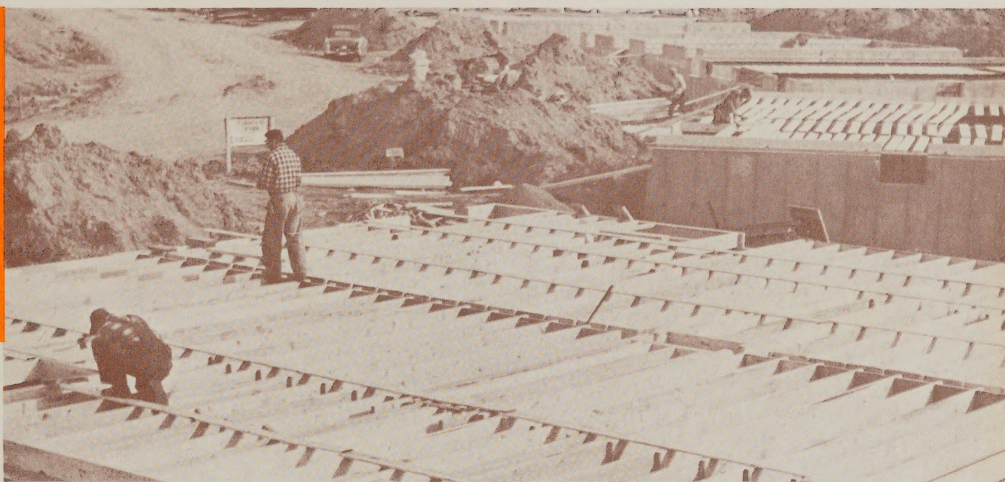


△ As concrete is poured into the forms it is rodded by workmen to prevent "honeycombing" and cavities in the finished foundation walls. Rodding can also be done mechanically with a special vibrator.

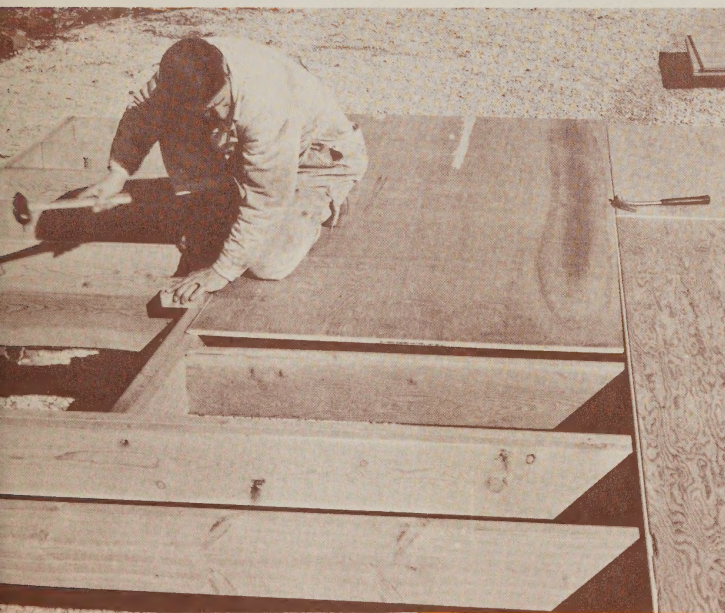



# floor joists


Here, 2 x 10 floor joists can be seen in a row of houses under construction.



## subflooring

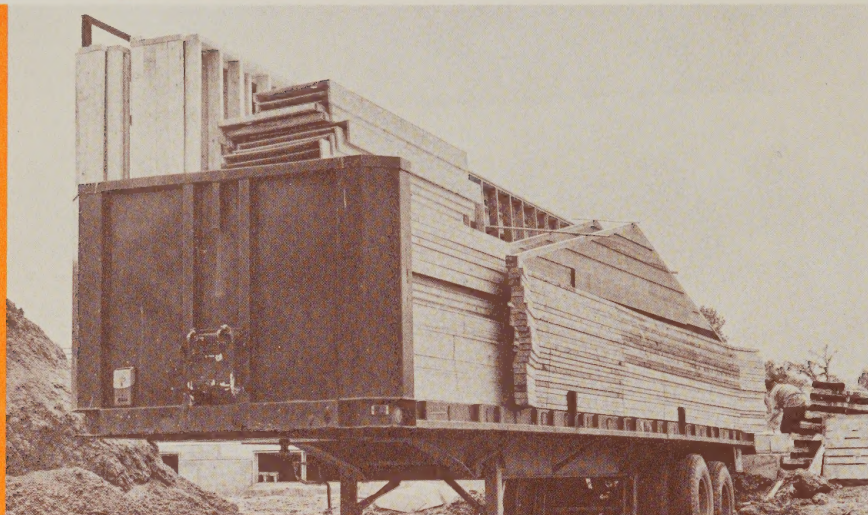


Use of Canadian fir plywood subflooring  eliminates waste and reduces application time. Panels are flat and there are no cracks or warped surfaces. All kinds of flooring material, particularly flexible flooring, lie flatter, look better and wear longer when applied over fir plywood.

 Tongue-and-groove plywood eliminates blocking and provides a flatter, tighter surface for finished flooring materials.



## prefabrication



◀ Prefabricated wall and roof units will be unloaded from this trailer as construction progresses. The entire structure, with the exception of joists and subflooring which workmen are completing, has been transported from the factory to the job site. Erection of wall units will begin as soon as subflooring is finished.

A complete house has been prefabricated in the factory and transported to the construction site in this semi-trailer. Prefabricating wall units and roof components permit speedier and more economical frame construction.







Exterior and interior walls are up and workmen are easing a gable end section into place. The section is complete with building paper, reinforcing and exterior cladding.

A gable end section is in place and a nailed "W" truss is being unloaded. The 24-foot trusses, made up of 2 x 4's are reinforced with metal or ½-inch plywood gusset plates.

## exterior walls

Frame walls may be built as whole sections. They can then be lifted into place as a unit. This is a speedier method and one in which wall frames can be factory prefabricated and transported to the construction site. Normal wall frames in platform construction consist of storey-high studs spaced at 16-inch centres to which top and bottom plates are nailed.



Here Canadian fir plywood sheathing is applied to the outside of stud frames. Purpose of sheathing is to stiffen the structure, improve insulation and provide an over-all nailing area for securing cladding material such as shingles. A "breather-type" building paper is applied to the outer face of the sheathing before adding the exterior cladding.

Wall studs are doubled at window openings as illustrated in this picture of a triple opening in a frame structure. A double-header lintel provides support over the opening and dwarf studs are used beneath the doubled sills. Window lintels vary in depth according to the width of the opening.







Plywood contributes rigidity to the building. This is especially important in house walls with large glass areas. This rigidity gives the designer greater scope. Use of plywood panels speeds up the closing-in process and gives the earliest possible protection from inclement weather.



Double studs used for window openings are seen here with dwarf studs replacing the double lintel commonly used to provide support over the opening. In the background various stages of upper-storey construction are shown.

## partition walls



Top plates are doubled where walls support the ceiling joists.



A frame structure now ready for exterior facing is shown here. Asphalt-impregnated sheathing and door framing are completed. The large picture-window opening illustrates the amount of window space which can be accommodated in a house of frame construction. Interior partitions are up and the subflooring has been laid.



# brickwork



In a frame house which is to be partly faced with brick, foundation walls should project far enough to allow a single outer leaf of 4½-inch brickwork and a one-inch air cavity between brick and plywood or asphalt-impregnated sheathing. Building paper, applied with galvanized nails over sheathing, forms a moisture barrier. Galvanized metal ties are used to bind the brick veneer to the timber structure. These should be spaced 32 inches apart horizontally and 15 inches apart vertically.



Window sash is sometimes fitted with glass before installation, although glazing is often carried out on the site.



A well-built chimney carried to sufficient height, is necessary for the best operation of heating units. This timber frame house has a stone facing and a shingle roof over plywood sheathing.



The almost limitless possibilities of exterior cladding are illustrated in this photograph depicting construction of a frame house. Here brick veneer, wood cladding and a decorative wood trim are all used. Other exterior cladding possibilities include wood, brick, stucco or various combinations.



# roof



Four by eight foot Canadian fir plywood panels are quickly applied to this frame home. They are placed with the grain of the face ply at right angles to the rafters. Fir plywood panels are flat, smooth; a perfect roof-sheathing for nearly all types of roofing.



Roof rafters, which overhang this car-port, are supported by heavy beams. A hip rafter bisects the corner angle of the overhang and jack rafters extend from it to the fascia board.

Here the roof is ready for plywood sheathing. Jack rafters extend from the corner hip rafter to the fascia board. The exterior walls are sheathed ready for the application of the finished cladding, brick or stone facing.

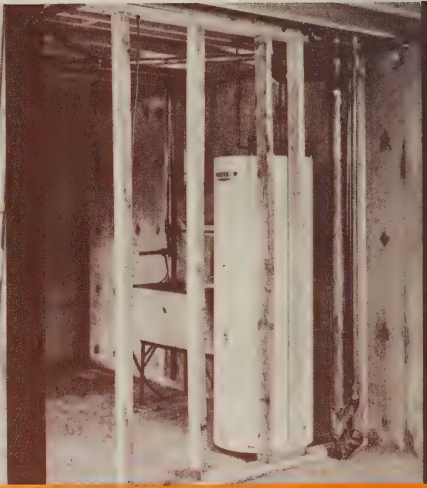
## rough plumbing



Construction of frame home walls is such that rough plumbing is concealed in the wall structure when the house is complete.

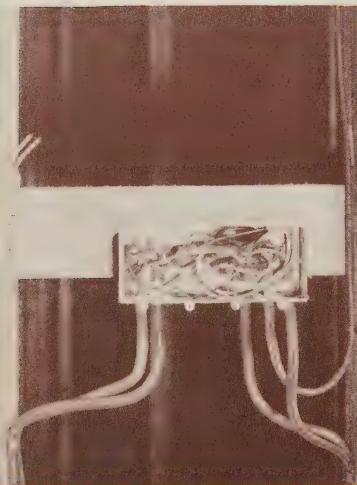


Once roofing and glazing are completed, making the house completely weather-tight, plumbing can be installed. This is carried out in two stages.

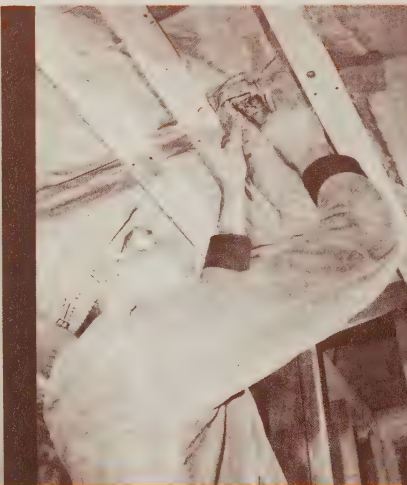


The soil pipe, and hot and cold pipes are exposed in the basement. In the upper storey of the timber frame house the pipes are concealed in the wall between the studs.

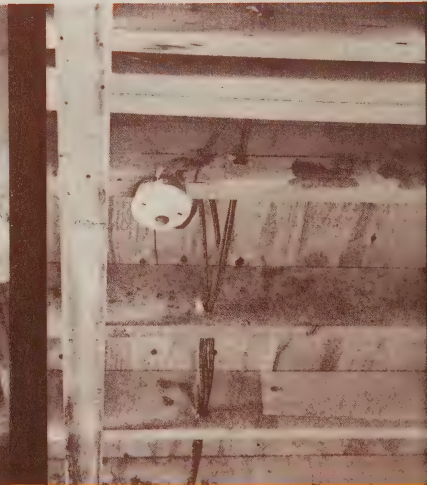
## wiring



Sufficient electrical outlets are provided in every part of the house to take care of both present and future needs. Wiring is concealed in the wall framing.



Electrical wiring can be installed immediately after roofing and glazing are completed. Here, an electrician installs a ceiling fixture. Wiring is concealed in the walls.



Floor joists in the basement are drilled to accommodate electrical wiring. Wiring for the upper storey of the timber frame house is concealed in the wall between 2 x 4 studs.

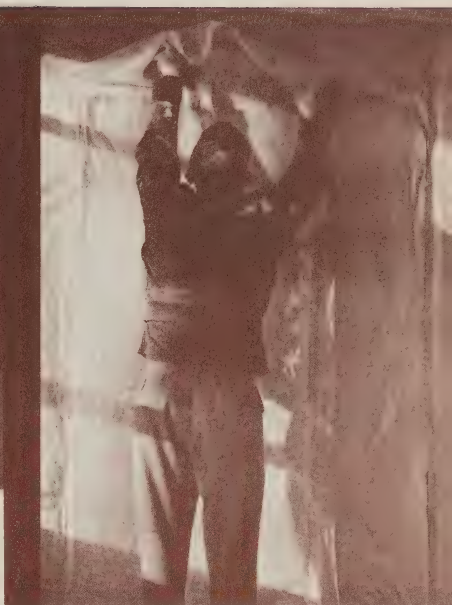


## insulation

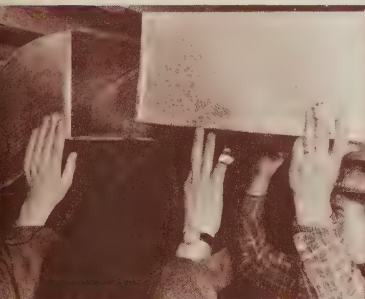


Here workmen apply two-inch insulating material between studs. Insulation prevents heat loss to the outside.

The vapour barrier is placed at the inner or warmer side of the house wall immediately behind the plasterboard or other wall lining. Its function is to keep water vapour out of the timber structure.



## heating



Installation of heating ducts is under way in this picture. The hollow wall structure of the frame house allows for simple installation of duct work.



A heating serviceman adjusts the various controls in this gas home heating unit.

A spacious basement area is a feature of this frame constructed home. Here there is ample room for an oil-fired warm-air heating unit, electric hot water heating unit and basement tubs. Heating ducts, placed close to the basement ceiling and water pipes located near basement walls, leave an open floor area.



## interior wall finishing



▲ Plasterboard is the most popular type of dry-wall finish used today. Standard dry-wall procedure consists of applying plasterboard on the timber framework, unless other lining material has been specified. Plasterboard is secured to studs with galvanized nails which are masked with special fillers. Joints are sealed and taped.



● Though the art of plastering is not new it still remains one of the more popular ways of finishing the interior of a modern home. The quality of finish depends largely on the plasterer's skill.



# finishing



▲ Canadian hardwood plywood is used extensively in this modern kitchen where good planning provides both charm and convenience.

Wood trim provides the finishing touch to a frame construction home. A top-grade material is not usually needed if the trim is to be painted. However, knotty lumber may be used with a clear finish for a rustic effect.



Beautiful long-wearing hardwood flooring is featured in many timber frame houses. One of the last phases is laying of tongue-and-groove strip hardwood flooring.



There is a type of flooring to suit every taste and purpose. Some insist on hardwood flooring, at least in the living and dining room, while others prefer resilient flooring throughout the home. Ceramic tile is popular for bathroom floors.

Installation of plumbing fixtures is one of the final steps in home construction. In the modern home, quality bathroom and kitchen installations and electrical fixtures of good design add distinction to the home's interior.





## exterior wall finish

This smartly-designed, trim house is a typical example of a frame home. Painted weatherboarding is used on the exterior walls. Only the landscaping remains to be done.



Wood cladding combined with stone facing makes an attractive exterior finish to this timber frame house. The double-glazed windows with draft excluders are of wood. A pre-cast concrete doorstep has been installed.



The exterior finish of this home blends western red cedar shingles, horizontal siding and brick veneer. It illustrates the warmth and beauty possible with timber frame construction.

# timber frame construction in britain



◀ This lovely house in Sevenoaks, Kent, built by A. P. Cooksey, A.R.I.B.A., illustrates the flexibility of design made possible through judicious use of timber frame construction. The over-all appearance is enhanced by using the butterfly roof technique.

Architect A. P. Cooksey, A.R.I.B.A., makes extensive use of wood in his own house in Sevenoaks, Kent. This view is from the living room to the dining alcove. Wood is used for both floor and wall in this section of the house.







✂ This streamlined, two-storey home, owned by Mr. F. Selby of Middlesex is a combination of platform frame and post and beam construction. Brick facing is used on the flank walls and cedar bevel-edge siding is used effectively on front and back elevations of this timber frame home. Cedar shingles are used on the roof.



✂ Interior use of wood is strikingly illustrated in this smart, simply designed lounge. Finished maple is used for flooring and cedar panelling highlights the room's fireplace area. Single board rails dramatize the staircase.



△ This house designed by architect Kenneth Wood, A.R.I.B.A., A.M.I.S.E., for Mr. and Mrs. Eric Paton in Surrey, uses post and beam construction for the intermediate level dining room at left. This section was designed to facilitate future extension. The whole of the first floor is framed in hemlock. Vertical weatherboarding applied to this framing is Douglas fir.

◀ Construction of this modern English timber frame house in Surrey, designed by architect Kenneth Wood, A.R.I.B.A., A.M.I.S.E., is well under way in this photograph. Double studs are used to provide solid support at both door and window openings. They also give ample nailing surface for sheathing and finishing materials.



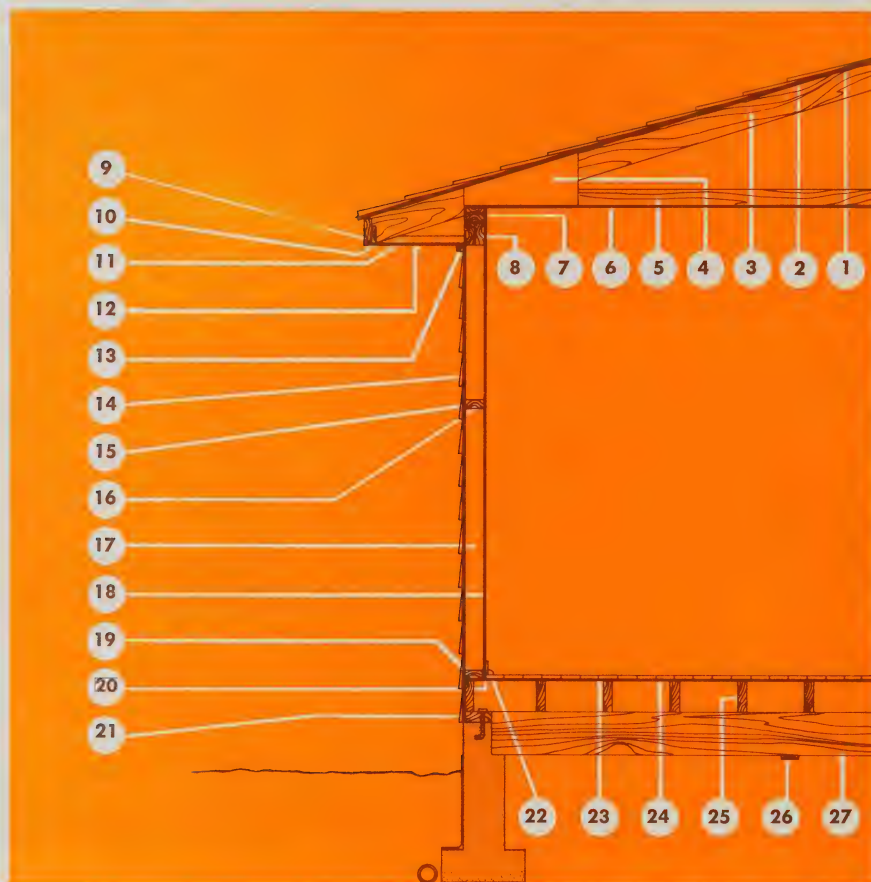


A combination of wood siding and brick veneer is used as an exterior cladding in these attractive, terrace buildings at Chesham Bois. They were designed by architect James H. Cox, A.R.I.B.A. for Amer-sham District Council as part of a scheme for elderly people. Each unit is designed to provide a high standard of comfort at low cost.



Cedar cladding is used extensively in this Downpatrick, Rural District Council Housing Scheme in Northern Ireland.

## canadian timber and plywood





	DOUGLAS FIR	PACIFIC COAST HEMLOCK	WESTERN WHITE SPRUCE	WESTERN RED CEDAR	EASTERN CANADIAN SPRUCE	QUEBEC YELLOW PINE	CANADIAN YELLOW BIRCH	CANADIAN HARD MAPLE
1	24" Shakes							
2	Roof Sheathing — Plywood							
3	Roof Truss, Upper Chord — 2" x 6"							
4	Gusset Plate — ½" Plywood							
5	Roof Truss, Lower Chord — 2" x 4"							
6	Ceiling Panelling — Plywood							
7	Double Top Plate — 2" x 4"							
8	Double Header — 2" x 6"							
9	Fascia Board — 1" x 6"							
10	Nailer Board — 1" x 4"							
11	Stiffener — 2" x 2"							
12	Soffit — ¼" Plywood							
13	Trim — ¾" x 1¼"							
14	Exterior Cladding — ¾" x 10"							
15	Exterior Wall Sheathing — Plywood							
16	Sill — 2 x 4							
17	Stud — 2 x 4							
18	Interior Wall Panelling							
19	Sole Plate — 2" x 4"							
20	Base Board — ½" x 2¼"							
21	Sill Plate — 2" x 6"							
22	1" — ¼ Round Mould							
23	Finished Flooring — ⅝" x 2¼" or ¾" x 1¼" Strip							
24	T & G Subflooring — Plywood							
25	Joists at 16" O/C — 2" x 8"							
26	Bridging — 1" x 4"							
27	4-Ply Built-up Beam — 2" x 10"							



## timber sizes

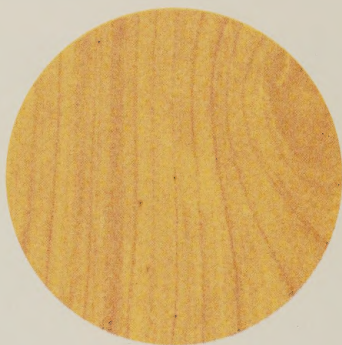
All cross sectional dimensions mentioned, unless otherwise stated, are nominal sizes of timber before planing. CLS (Canadian Lumber Standards) timber 2" thick and less than 6" wide is surfaced to finish  $\frac{3}{8}$ " less than the nominal sawn size in thickness and width. CLS timber 6" and over in width finishes  $\frac{3}{8}$ " under nominal in thickness and  $\frac{1}{2}$ " less in width. Specification of timber sizes is based on the use of surfaced CLS timber.







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